

WORKING TO I.D. FOES OF EMERALD ASH BORERS

The emerald ash borer, a major threat to ash trees, may have met the enemy. And it's now up to researchers, including those at ARS's Systematic Entomology Laboratory (SEL), to figure precisely who that enemy is.

Among invasive insects, the metallic-green beetle, *Agrilus planipennis* Fairmaire, poses one of the greatest threats of becoming a major pest in the United States. Since its discovery near Detroit in May 2002, it has devastated ash populations in Michigan—where it killed about 6 million trees—as well as in parts of Ohio and Ontario, Canada. The beetle has recently been sighted in Indiana, Maryland, and Virginia but is under close watch in those states to prevent further spread.

Ash is a valuable hardwood that provides habitat for wildlife, ornamentals for landscapes, and wood for handles, oars, baseball bats, furniture, and baskets.

The emerald ash borer—which feeds beneath the bark of green (*Fraxinus pennsylvanica*), white (*F. americana*), blue (*F. quadrangulata*), and black (*F. nigra*) ash trees—probably originated in eastern Asia. It's likely that it was inadvertently introduced here roughly 6 years ago, hidden in wooden packing material.

"We know of three species of parasitic wasps that are natural enemies of these beetles," says SEL entomologist Michael Schauff, who is based in Beltsville, Maryland. He and fellow entomologist Michael Gates, who works out of SEL's Washington, D.C., facilities, are leading ARS's taxonomic work against the pest.

"But we can't put a name on these potentially helpful wasps without first doing research. We do suspect that some of these species have been unknown to science up to this point."

Researchers with the U.S. Forest Service and Michigan State University found the potentially beneficial insects in a study plot in Livonia, Michigan. Unable to identify the wasps, they sent samples to Gates and Schauff, who determined them to be species of the genus *Balcha*, which like to snack on the ash borer's larvae, and the genus *Pediobius*, which attack its eggs. But pinpointing the wasps' precise identity will entail much work. Schauff says the genus *Pediobius* alone contains about 215 species worldwide, 32 of which are found in North America.

SEL's work is just one part of ARS's emerald ash borer campaign. Entomologist Paul W. Schaefer and colleagues at ARS's Beneficial Insects Introduction Research Unit in Newark, Delaware, hope to analyze the borers' DNA. They've traveled to South Korea, Japan, and Mongolia in search of the insect's origin, hoping also to find its natural enemies.



Manual montage image (a technique pioneered by Klaus Bolte of Canada) of a *Balcha* sp. wasp, a potentially beneficial insect that attacks the ash borer. To create this image, the wasp specimen was dissected—legs, antennae, wings, and other body parts separated—then the parts were digitally captured and reassembled in Photoshop. This technique allows exquisite detail to be shown.

"The biology and behavior of any biological control agents we find will be intensively investigated, and we'll conduct host-range studies to ensure that these agents will be suitable for release and use against the insect," Schauff says. They'll also explore ways to trap the borers and perhaps manipulate the behavior of their natural enemies.—By **Luis Pons**, ARS.

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Adult emerald ash borers emerge from infested ash tree (*Fraxinus pennsylvanica*).

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